WHAT IS CLAIMED IS:

Sub B11

1. A three-axis sensor assembly for use in an elastomeric material, the sensor comprising:

a first pair of sensors disposed along a first pair of respective axes that intersect, said first sensors detecting a force in a first direction;

a second pair of sensors disposed along a second pair of respective axes that intersect, said second sensors detecting a force in a second direction generally orthogonal to the first direction; and

wherein the force measured in the first direction is equal to the difference between the outputs of said first sensors, and the force measured in the second direction is equal to the difference between the outputs of said second sensors.

2. The three-axis sensor assembly of Claim 1, wherein the sum of the outputs of said first sensors and said second sensors equals a force in a third direction orthogonal to said first and second directions.

3. The three-axis sensor of Claim 1, wherein said first pair of respective axes are generally oriented at a first angle with respect to the first direction.

4. The three-axis sensor assembly of Claim 3, wherein said second pair of respective axes is generally oriented at a second angle with respective to the second direction.

5. The three-axis sensor assembly of Claim 4, wherein said first and second angles are equal.

6. Thee three-axis sensor assembly of Claim 5, wherein said first and second angles are 45 degrees. preference

7. The three-axis sensor assembly of Claim 1, wherein said first pair of sensors are disposed on first opposed faces of a pyramid-shaped body, and said second pair of sensors are disposed on second opposed faces of said pyramid-shaped body. preference

8. The three-axis sensor assembly of Claim 1, wherein the three-axis sensor is embedded in the elastomeric material.

9. The three-axis sensor assembly of Claim 7, wherein said body is made of the same material as the elastomeric material.

Sub C2

10. A three-axis sensor assembly embedded in an elastomeric material, the sensor comprising:

a first sensing element generating a first output indicative of strain in a first direction;

a second sensing element generating a second output indicative of strain in a second direction orthogonal to said first direction; and

wherein the sum of said first and second outputs is indicative of strain in a third direction orthogonal to both the first direction and the second direction.

11. A sensor assembly embedded in an elastomeric material, said sensor assembly comprising:

a pair of first strain sensors disposed on first opposed faces of a flexible pyramid-shaped body, said first strain sensors detecting a force in a first direction; and

wherein said first strain sensors generate corresponding output signals in response to the force in the first direction, and wherein the force in the first direction is generally equal to the difference between the output signals of said first strain sensors.

12. The sensor assembly of Claim 11, further comprising:

a pair of second strain sensors disposed on second opposed faces of said body, said second opposed faces adjacent to said first opposed faces, and said second strain sensors detecting a force in a second direction generally orthogonal to said first direction;

and wherein said second strain sensors generate corresponding output signals in response to the force in the second direction, and wherein the force in the second direction is generally equal to the difference between the output signals of said second strain sensors.

13. The sensor assembly of Claim 12, wherein a sum of the first output signals and the second output signals is indicative of a force in a third direction is orthogonal to the first and second directions.

14. The sensor assembly of Claim 11, wherein said body is made of the same material as the elastomeric material.

15. The sensor assembly of Claim 11, wherein said body has a body hardness greater than the hardness of the elastomeric material.

16. The sensor assembly of Claim 15, wherein the hardness of the elastomeric material is generally between 50 and 70 on the Shore A hardness scale. preference

Sub B19

17. The sensor assembly of Claim 16, ~~wherein body~~ is made of one ~~polyamide,~~ urethane and epoxy.

18. The sensor assembly of Claim 11, wherein said first strain sensors are parallel plate capacitors. preference

19. The sensor assembly of Claim 11, wherein said first strain sensors are piezoresistive silicon strain gauges. preference

20. The sensor assembly of Claim 11, wherein said first strain sensors are piezoelectric devices. preference

21. The sensor assembly of Claim 20, wherein at least one of said piezoelectric devices is one of PZT, ZnO, and PVDF. preference

22. The sensor assembly of Claim 11, wherein said first strain sensors are interdigitated finger capacitors. preference

23. The sensor assembly of Claim 13, further including a plurality of sensor assemblies embedded in an object in a mutually spaced relationship. preference

24. The sensor assembly of Claim 23, ~~wherein the object~~ is a tire.

25. The sensor assembly of Claim 24, further including a bus to communicate signals generated by the plurality of sensor assemblies.

26. The sensor assembly of Claim 25, wherein said bus is a five-wire bus.

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27. The sensor assembly of Claim 24, wherein a contact region is defined at a position where the tire contacts a surface.

28. The sensor assembly of Claim 27, wherein, when the tire is operation, each of the plurality of sensors passes said contact region at a different time.

29. The sensor assembly of Claim 11, wherein the elastomeric material comprises a tire.

Sub B13

30. A process of embedding a three axis sensor in an elastomeric material, the process comprising:

providing a three-axis sensor including two pairs of strain gauges, a first pair disposed on first opposed faces of a pyramid-shaped body and, a second select pair disposed on second opposed faces of said pyramid-shaped body;

adjusting the aspect ratio of the pyramid to the sensitivity of the three-axis sensor.

31. The process of Claim 30 further including the step of adjusting the hardness of the pyramid-shaped body relative to the elastomeric material.

32. The process of Claim 30, wherein the sensor is introduced to the elastomeric material when the elastomeric material is in an uncured state.

Sub B14

33. The process of Claim 30, further including the step of encapsulating three-axis sensor in a second material different than the elastomeric material.

34. The process of Claim 33, further including the step of selecting a ratio of elastic moduluses between the elastomeric material and the second material.

35. The process of Claim 34, wherein the second material is one of polyimide and epoxy.

ADD B15